

IN THE CLAIMS

The following is a complete listing of the claims, and replaces all earlier versions and listings.

1.-20. (Canceled)

21. (Previously Presented) An image processing apparatus comprising:
extraction means for extracting a text area from multi-valued image data, and generating position data of the text area;
color computation means for generating representative color data of a text portion in the text area;
generation means for generating text image data expressed by the representative color in the text area;
conversion means for generating non-text multi-valued image data by converting multi-valued image data of the text portion using multi-valued image data of a portion other than the text portion;
first compression means for compressing the non-text multi-valued image data; and
second compression means for compressing the text image data, wherein said color computation means includes:
color palette generation means for generating at least one color palette as the representative color data by executing a color reduction process of a text image in the text area, and
said generation means includes:
color-reduced image generation means for generating color-reduced image data corresponding to the color palette.

22. (Previously Presented) The apparatus according to claim 21, wherein said color-reduced image generation means

outputs binary image data of the text area as the reduced-image data for the text area in which the number of palettes generated by said color palette generation means is 1, and

generates as the reduced-image data $(n+1)$ -valued image data, n being a natural number not less than 2, indicating correspondence between respective pixels, and color palettes or a non-text image portion for the text area in which the number of palettes generated by said color palette generation means is n .

23. (Original) The apparatus according to claim 22, wherein said second compression means uses different compression methods for the binary image data and $(n+1)$ -valued image data.

24. (Original) The apparatus according to claim 23, wherein said second compression means executes a compression process complying with MMR compression for the binary image data, and executes compression process complying with ZIP compression for the $(n+1)$ -valued image data.

25. (Original) The apparatus according to claim 21, wherein said first compression means executes a compression process complying with JPEG compression.

26. (Original) The apparatus according to claim 21, wherein said second compression means executes a compression process complying with MMR compression.

27. (Original) The apparatus according to claim 21, further comprising third compression means for coupling the position data, representative color data, and outputs from said first and second compression means, and compressing the coupled data by a reversible compression method.

28. (Original) The apparatus according to claim 21, further comprising reduced-image segmentation means for generating binary image data for each color palette from the reduced-image data in one text area in which a plurality of color palettes are generated, and

wherein said second compression means compresses the binary image data for respective color palettes, which are generated by said reduced-image segmentation means.

29. (Original) The apparatus according to claim 21, further comprising: reduced-image segmentation means for generating new text areas including binary text image data for respective color palettes from the reduced-image data in one text area in which a plurality of color palettes are generated; and

inclusive image generation means for generating inclusive image data including a plurality of text areas having similar color palettes, and position data of the inclusive image, and

wherein said second compression means compresses the inclusive image data as the text image data.

30. (Original) The apparatus according to claim 29, wherein said inclusive image generation means includes:

determination means for determining the text areas to be included in the inclusive image on the basis of compression efficiency.

31. (Original) The apparatus according to claim 30, wherein said inclusive image generation means includes:

size computation means for computing a first size obtained upon generating and compressing an inclusive image including first and second text areas, and a second size obtained upon individually compressing the first and second text areas without generating the inclusive image, and

when the first size is smaller than the second size, the inclusive image including the first and second text areas is generated.

32. (Previously Presented) An image processing apparatus for expanding an image compressed by an image processing apparatus claimed in claim 21, comprising:

first expansion means for expanding the non-text multi-valued image data compressed by said first compression means;

second expansion means for expanding the text image data compressed by said second compression means; and

image combining means for receiving the position data and representative color data, and generating the multi-valued image data on the basis of the text image data and non-text multi-valued image data.

33. (Currently Amended) An image processing apparatus comprising:
extraction means for extracting a text area from multi-valued image data, and generating position data of the text area;

color computation means for generating representative color data of a text portion in the text area;

generation means for generating text image data expressed by the representative color in the text area;

conversion means for generating non-text multi-valued image data by converting multi-valued image data of the text portion using multi-valued image data of a portion other than the text portion;

first compression means for compressing the non-text multi-valued image data; and

second compression means for compressing the text image data, wherein said generation means includes binarization means for applying a differential derivation filter to the multi-valued image data, computing edge amounts of pixels that form the multi-valued image with neighboring pixels, and binarizing the data on the basis of the edge amounts.

34. (Original) The apparatus according to claim 33, wherein said first compression means executes a compression process complying with JPEG compression.

35. (Original) The apparatus according to claim 33, wherein said second compression means executes a compression process complying with MMR compression.

36. (Original) The apparatus according to claim 33, further comprising third compression means for coupling the position data, representative color data, and outputs from said first and second compression means, and compressing the coupled data by a reversible compression method.

37. (Original) The apparatus according to claim 33, further comprising inclusive image generation means for generating inclusive image data including a plurality of text areas having similar representative color data, and position data of the inclusive image, and

wherein said second compression means compresses the inclusive image data as the text image data.

38. (Original) The apparatus according to claim 37, wherein said inclusive image generation means includes:

determination means for determining the text areas to be included in the inclusive image on the basis of compression efficiency.

39. (Original) The apparatus according to claim 38, wherein said inclusive image generation means includes:

size computation means for computing a first size obtained upon generating and compressing an inclusive image including first and second text areas, and a second size obtained upon individually compressing the first and second text areas without generating the inclusive image, and

when the first size is smaller than the second size, the inclusive image including the first and second text areas is generated.

40. (Original) An image processing apparatus for expanding an image compressed by an image processing apparatus cited in claim 33, comprising:

first expansion means for expanding the non-text multi-valued image data compressed by said first compression means;

second expansion means for expanding the text image data compressed by said second compression means; and

image combining means for receiving the position data and representative color data, and generating the multi-valued image data on the basis of the text image data and non-text multi-valued image data.

41.-50. (Canceled)

51. (Previously Presented) An image processing method comprising: an extraction step, of extracting a text area from multi-valued image data, and generating position data of the text area;

a color palette generation step, of generating at least one color palette by executing a color reduction process of a text image in the text area; a generation step, of generating color-reduced text image data corresponding to the color palette;

a conversion step, of generating non-text multi-valued image data by converting multi-valued image data of the text portion using multi-valued image data of a portion other than the text portion;

a first compression step, of compressing the non-text multi-valued image data; and

a second compression step, of compressing the text image data.

52. (Currently Amended) An image processing method comprising:

an extraction step, of extracting a text area from multi-valued image data, and generating position data of the text area;

a color computation step, of generating representative text color data of a text portion for each text area;

a generation step, of generating text image data;

a conversion step, of generating non-text multi-valued image data by converting multi-valued image data of the text portion using multi-valued image data of a portion other than the text portion;

a first compression step, of compressing the non-text multi-valued image data; and

a second compression step, of compressing the text image data,

wherein said generation step includes a binarization step, of applying a differential derivation filter to the multi-valued image data, computing edge amounts of pixels that form the multi-valued image with neighboring pixels, and binarizing the data on the basis of the edge amounts.

53.-55. (Canceled)

56. (Previously Presented) A computer readable memory that stores a compression program for compressing multi-valued image data,

said compression program comprising:

code of an extraction step, of extracting a text area from multi-valued image data, and generating position data of the text area;

code of a color palette generation step, of generating at least one color palette by executing a color reduction process of a text image in the text area;

code of a generation step, of generating color-reduced text image data corresponding to the color palette;

code of a conversion step, of generating non-text multi-valued image data by converting multi-valued image data of the text portion using multi-valued image data of a portion other than the text portion;

code of a first compression step, of compressing the non-text multi-valued image data; and

code of a second compression step, of compressing the text image data.

57. (Currently Amended) A computer readable memory that stores a compression program for compressing multi-valued image data, said compression program comprising:

code of an extraction step, of extracting a text area from multi-valued image data, and generating position data of the text area;

code of a color computation step, of generating representative text color data of a text portion for each text area;

code of a generation step, of generating text image data;

code of a conversion step, of generating non-text multi-valued image data by converting multi-valued image data of the text portion using multi-valued image data of a portion other than the text portion;

code of a first compression step, of compressing the non-text multi-valued image data; and

code of a second compression step, of compressing the text image data,

wherein said generation step includes a binarization step, of applying a differential derivation filter to the multi-valued image data, computing edge amounts of pixels that form the multi-valued image with neighboring pixels, and binarizing the data on the basis of the edge amounts.

58. (Canceled)